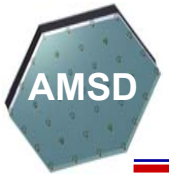


GOODRICH

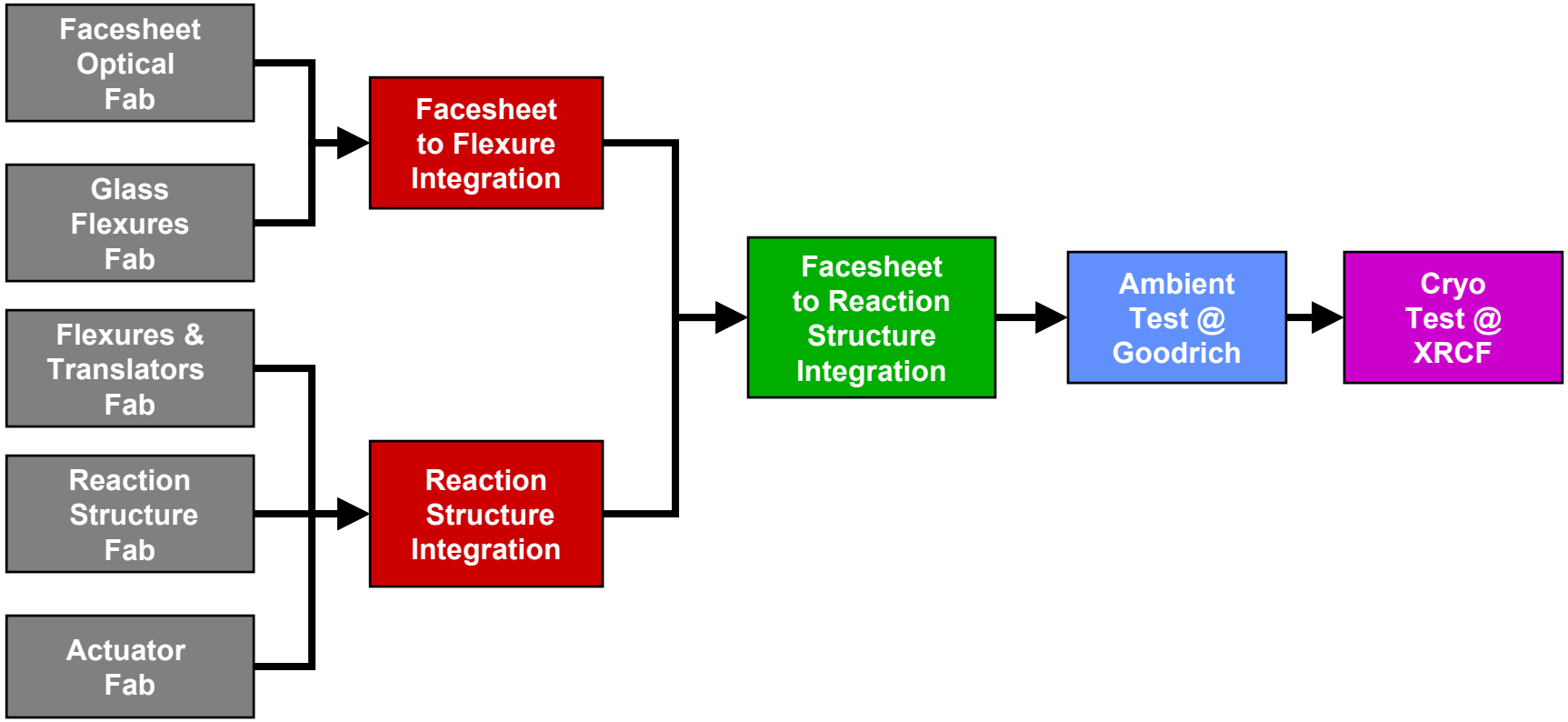
ADVANCED MIRROR SYSTEM DEMONSTRATOR (AMSD)

AMBIENT AND CRYOGENIC TEST PLANS AT GOODRICH ELECTRO-OPTICAL SYSTEMS

Mark Furber
Goodrich Electro-Optical Systems
100 Wooster Heights Road
Danbury, CT 06810

NASA Technology Days
Marshall Space Flight Center
May 22-23, 2002

Process Flow Summary



Test & Verification
(RT at Goodrich)

Actuator Attach Test

- Verifiy actuators attachment

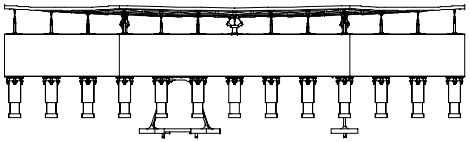
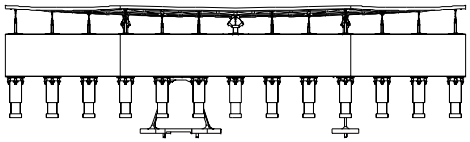


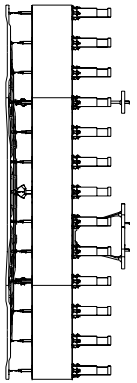
Figure Actuators

Optimize figure



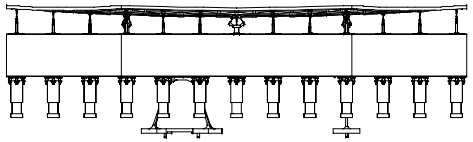
Actuator "zero" can be reset using manual coarse adjust

Interferometry

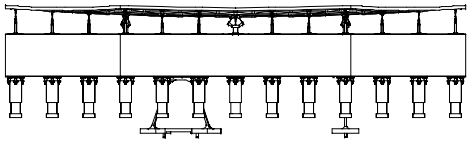


Modal Test

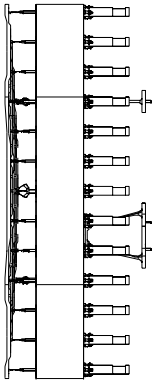
Modal survey using low-level excitation



CCP (As Required)

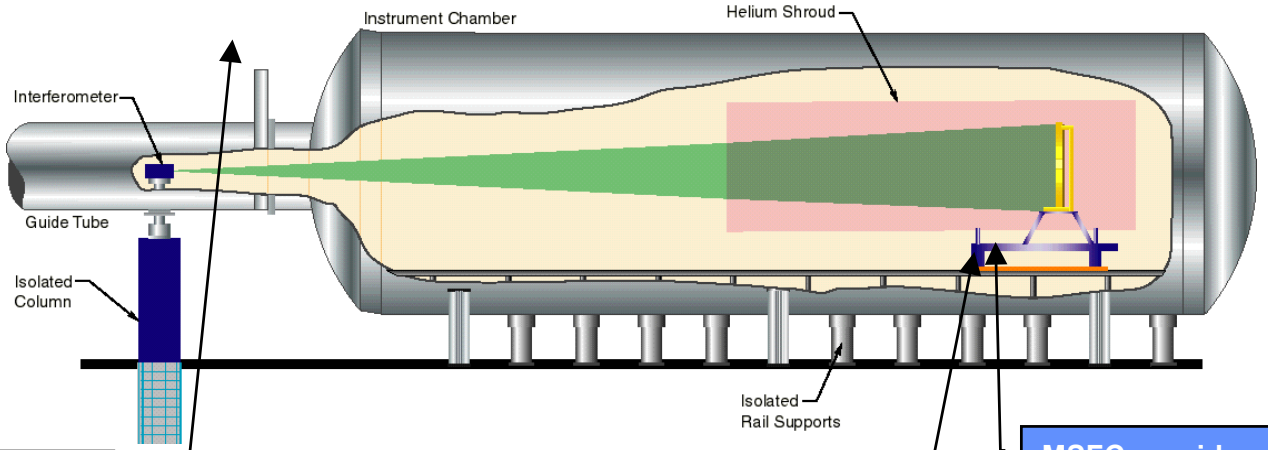


Final Ambient Optical Testing



Ship To MSFC for Cryo Testing

Cryo Test Arrangements at the XRCF



MSFC provides:
- Interferometer
- Objective Lens
- Leica ADM
- Window
- DNC

Goodrich provides:
- In-chamber cabling for actuators & temp. sensors
- Out-chamber cabling for actuators
- Mirror Assembly temp. sensors
- Actuator Control Electronics & PC

MSFC provides:
- Vacuum feedthroughs
- Cabling to control room
- Temp. sensor's readouts
- 5 DOF positioning table

- Establish ambient baseline alignment
- Measure ambient baseline figure

→ Partially cool chamber →

- Measure figure
- Adjust figure actuators as required to minimize figure error
- Track actuator and despace changes over temperature range

→

- Measure figure at cryogenic operating temperature

Test & Verification Plan (Summary)

Ambient at Goodrich

- **Install and align test article**
- **Verify software and electronic functionality**
- **Manual figure correction**
  - Visual
- **Determine noise levels (OPD, influence functions)**
- **Influence function measurement**
- **Optimize figure**
  - Use measured influence functions
- **Initial data reduction**
  - Document results
- **Pack and ship to MSFC**

Ambient and Cryo at MSFC

- **Install and align test article**
- **Check out interferometer and software and electrical Interfaces**
- **Room temperature characterization as done at Goodrich**
- **Radius of curvature monitoring throughout**
- **Cryo Test**
  - Cool down, adjusting figure intermittently as needed
  - At cryo:
    - **Check actuator functionality**
    - **Manually optimize figure**
    - **Measure influence functions & associated noise**
    - **Optimize figure**
    - **Actuator/influence function characterization measurements**
  - Return to RT, adjusting figure intermittently as needed
- **Remove test article**

Top-Level AMSD Program Schedule

(as of 5/22/02)